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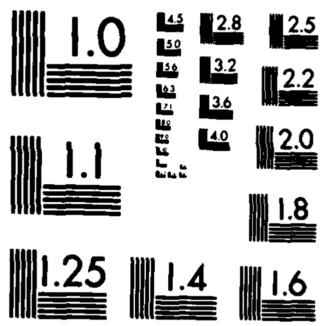

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20. Abstract (continued)

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Roger T. Johnson, David W. Johnson, and Mary Beth Stanne

University of Minnesota

202 Pattee Hall

Minneapolis, Minnesota 55455

February, 1985

Running Head: Effects of cooperative

Abstract

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The Effects of Cooperative, Competitive, and Individualistic Goal Structures on Computer-Assisted Instruction

The instructional use of computers is mushrooming within the United States. The number of personal computers for instructional use in public elementary and secondary schools has risen from 31,000 in 1981 to 325,000 in 1983 and is expected to double in each of the next five years. This growth of computer technology presents education with several challenges. One of the challenges involves promoting the effective instructional use of computers without increasing the isolation and alienation of students. Computer-assisted instruction brings with it the possibility that student interaction with computers may result in less interaction with teachers and classmates. There has been an individualistic assumption dominating the instructional use of computers. One student to a computer is the usual rule and computer programs have been written accordingly. Many teachers and soft-ware designers automatically assume that all computer-assisted instruction should be structured individualistically. The assumption that learning works best when one student works with one computer remains largely unquestioned. The possible use of computer-assisted cooperative or competitive instruction is largely ignored. Because interpersonal interaction is an important influence on instructional effectiveness and classroom climate (Johnson & Johnson, 1983), computer-assisted instruction may have a detrimental effect on educational practice. Whether computer-assisted cooperative, competitive, or individualistic instruction is most effective in promoting desired learning outcomes is an empirical issue.

Given that in almost all schools the number of students far exceeds the number of computers, it is inevitable that students will work with computers in small groups. In such learning groups students may work individualistically and take turns using the computer, they may compete to see who is best, or they may cooperate. Like any academic task, tasks presented by computers may be structured cooperatively, competitively, or individualistically. The central purpose of this study is to compare the relative efficacy of computer-assisted cooperative, competitive, and individualistic learning.

In a cooperative learning situation, students' goal achievements are positively correlated; when one student achieves his or her goal, all others with whom he or she is cooperatively linked achieve their goals (Deutsch, 1962; Johnson & Johnson, 1975). In a competitive learning situation, students' goal achievements are negatively correlated; when one student achieves his or her goal, all others with whom he or she is competitively linked fail to achieve their goals. In an individualistic learning situation, students' goal achievements are independent; the goal achievement of one student is unrelated to the goal achievement of others. Each of these goal structures may be used with learning tasks involving the use of computers.

There is an absence of research comparing the relative effectiveness of computer-assisted cooperative, competitive, and individualistic learning in promoting achievement, task-related interaction among students, positive attitudes toward the subject area and instructional experience, and relationships among students. Of special interest is the relative performance of male and female students in computer-assisted instructional situations. More specifically, the questions addressed in this study are as follows. What is the relative efficacy of computer-assisted cooperative, competitive, and individualistic learning on the:

1. Quantity and quality of daily achievement, problem-solving success, and test performance of male and female students?
2. Task-related oral interaction patterns of male and female students?
3. Attitudes of male and female students toward the subject being studied and the instructional experience?
4. Relationships among students?

There is some controversy as to whether the instructional use of computers will affect students' achievement. While some researchers have concluded that the use of computers does raise student achievement (e.g., Kulik, Bangert, & Williams, 1983), others have concluded that a computer is a vehicle that delivers instruction but does not in and of itself affect student achievement (Clark, 1983). While computer-assisted instruction is most often used within drill-and-practice situations aimed at memorizing basic facts and increasing the quantity of production, there is hope that an increased use of computer-assisted instruction in more complex learning situations will increase students' ability to apply their knowledge and solve problems. It is of interest, therefore, to investigate the impact of computer-assisted cooperative, competitive, and individualistic learning on quantity and quality of daily performance, problem-solving success, and test questions requiring different levels of cognitive functioning. Since the previous research indicates that cooperative learning situations generally promote higher achievement than do competitive or individualistic learning (Johnson, Maruyama, Johnson, Nelson, & Skon, 1981; Sharan, 1980), it may be hypothesized that higher performance on all the achievement measures will be found in the cooperative condition. None of this research, however, has involved computer-assisted instruction. There is a need to extend the previous research on achievement to computer-assisted instruction situations.

There has been almost no systematic investigation of the nature of the interaction among students working in groups with a microcomputer. There are anecdotal descriptions of students sharing ideas when writing stories with a computer (Rubin, 1980, 1982; Zacchei, 1982), when producing publications such as class newsletters (Collins, Bruce, & Rubin, 1982), and writing a program (Japs, 1981). Planned observations of students working in groups at computers, however, have not been conducted. There are at least three types of statements that students may make while working at a microcomputer: task statements involving presenting and elaborating on the information being learned, management statements involving informing other students on the procedures being used to accomplish the group's work, and social statements unrelated to the task or the working procedures of the group. These statements may be addressed to other students or to the teacher. In this study the frequency of task, management, and social statements will be observed to determine the impact of the microcomputer on interaction among students and between the students and the teacher.

There is some evidence that cooperative learning situations promote more positive attitudes toward the subject area and the instructional experience than do competitive or individualistic learning experiences (Johnson & Johnson, 1983; Sharon, 1980). The use of computers within the instructional situation, however, often produces high interest in the class which may result in positive attitudes toward working with computers and toward the subject area being studied. It is of some interest to determine if the positive views of computer-assisted instruction extend to competitive and individualistic learning situations.

There is reason to believe that in computer-assisted instruction males may achieve higher, have more positive attitudes toward computers and science class, and feel more confidence in their ability in learning with computers than will females. At three different age levels (9, 13, and 17 years), the achievement level of males was higher than that of females in three national assessments of science (1969, 1973, and 1977) (NAEP, 1978). In the 1977 national assessment, at all three age levels males were more likely than females to have favorable attitudes toward science classes and science related careers. Johnson, Johnson, Scott, & Ramolae (1985) found that in science classes males achieved higher than did females, males liked science better, and males were more confident of their ability to achieve in science. There were no significant differences in their study between males and females on perceiving science as a male domain. Steinkamp (1982) found that in general females did <u>not</u> view science as a male domain, but females did have more negative attitudes toward science and science classes. At every level, from kindergarten through graduate school, women are underrepresented in computer studies (Kolata, 1984). The gap in computer skills between girls and boys starts in elememtary school and grows through high school. The ratio of boys to girls involved with computers appears to increase the more advanced, effortful, or costly the level of involvement (Hess & Miura, in press; Kiesler, Sproull, & Eccles, 1983). A second purpose of this study, therefore, is to compare the results of computer-assisted cooperative, competitive, and individualistic learning on male and female students.

Despite the fact that females seem to avoid computers, a number of studies have found no difference between males and females in attitudes toward learning with computers (Castleberry, Montague, & Lagowski, 1970), although females may be more apprehensive about computer-assisted instruction than males (Howe, 1971-1972).

Most of the tasks used in the previous research on the educational use of microcomputers has focused on drill-and-practice or programming tasks. There are fewer studies on the use of the microcomputer to work on problem-solving tasks. In this study, therefore, a problem-solving task is used.

Method

Sample

Subjects were 73 eighth-grade students (ages 11-13) from a midwestern, suburban, middle-class school district. All subjects were assigned to three conditions stratifying for sex and ability level. Twenty-three students (12 males and 11 females) were assigned to the cooperative condition, 22 students (11 males and 11 females) were assigned to the competitive condition, and 25 students (14 males and 11 females) were assigned to the individualistic condition.

Procedure

In all conditions students were involved in a 10-day instructional unit that paired a computer simulation with written materials on the fundamentals of map reading and navigation. The computer simulation required students to sail an ancient ship to the new world and back in search of gold, using the sun, stars, ocean depth, climate, and trade winds to navigate. The daily instructional sessions lasted 45 minutes. Each condition was assigned a separate classroom and given access to six computers. The amount of computer time available to each student was balanced across conditions. Three certified teachers (with over 90 hours of training in how to structure cooperative, competitive, and individualistic learning) worked from prepared scripts, giving directions and supervising daily activities. Each day the teachers would explain the day's task to the students, distribute the appropriate materials, and review the condition's goal structure. At the end of the instructional session the completed work and all materials were collected. To control for possible teacher effects, the teachers rotated among conditions so that each teacher taught each condition approximately one-third of the time. Six research assistants observed student oral interaction on a daily basis in all conditions. Each observer received 25 hours of training on the observation instruments. There were at least two observers in each condition each day. Observers rotated so that they observed each condition an approximately equal number of times. The research assistants observed the groups in random order for 2 minutes each. They conducted interrater reliability checks (interrater reliability was over 80 percent using the percentage method of agreement and disagreement for occurrence, quality, and direction).

Curriculum

A modification of a computer simulation named Geography Search (Snyder, 1982) was used in the study. The computer simulation was supplemented with written materials on the fundamentals of map reading and navigation. All students were initially trained in how to get on file with the program on the computer. The computer simulation required students to sail an ancient ship to the new world and back in search of gold, using the sun, stars, ocean depth, climate, and trade winds to navigate. The basic role of the computer was to be an adjunct to (a) students' decision making and problem solving and (b) the written technical materials by providing information and giving feedback on the consequences of the actions taken. The role of the students was to master the relevant technical information and apply their knowledge in deciding what actions to take to successfully complete the problem-solving task, utilizing the computer to record their decisions and give feedback on the consequences.

Students initially had to decide whether to go ashore, follow the coast, or sail their ship. The direction the ship could sail depended on the direction of the wind. The students would have to decide whether to sail a whole day or a fraction of a day. Sailing cost the student in terms of supplies (such as food and water) and certain hazards existed such as storms and pirates. The goal of the simulation was to sail to a new continent, find the City of Gold, obtain as much gold as possible, and return to the starting point. Students had to keep track of wind direction, wind speed, their latitude and longitude, the depth of the water, food provisions, and the temperature. Each day they recorded their position on a navigational map. Because of weather conditions students may need to start over, they could starve at sea, and they could be attacked by pirates. Each class session students were given materials to read. Typical reading assignments included how to determine latitude from the position of the stars, how to determine longitude from the position of the sun, and how wind direction and speed affects sailing. After planning what to do students would go to the computer and enter their decisions, the computer would determine the results of the action taken and give additional information such as wind direction and speed and the position of the stars, the students would record the results and the information, and then the students left the computer to plan their next series of actions.

Independent Variables

The independent variables were (a) cooperative versus competitive versus individualistic learning and (b) male versus female students. In the computer-assisted cooperative learning condition students were randomly assigned to computers in groups of four (stratifying for sex and ability) and were instructed to work together as a group in completing the computer simulation task. The group's goal was to sail to the New World and back, accumulating as much gold as possible. In doing so they were to ensure that all group members learned the map reading and navigational skills taught in the simulation. Students were informed that (a) they would individually complete daily worksheets and take a final test, (b) their unit grade would be based on the average of the scores of their group members on the final test and the daily worksheets, and (c) they would be awarded bonus points on the basis of how much gold the total class accumulated (10 percent of the gold all cooperative groups accumulated). Three times during the unit a subgoal was given and bonus points awarded. Subgoals included (a) how fast can your ship reach land, and (b) how fast can all the ships in the class reach land. Groups received daily feedback on how well they were performing. Group members were assigned specific roles (captain, navigator, meteorologist, and quartermaster), which were rotated among group members daily. These roles focused on task (learning the material, recording information from computer, completing the work, making sailing decisions by consensus, checking members' understanding) and maintenance (encouraging participation by all group members) behaviors. The role of the teacher was to structure each day's work and monitor the learning groups to ensure that appropriate collaborative and role behaviors were taking place.

In the computer assisted competitive learning condition students were randomly assigned to computers in groups of four stratifying for sex and ability and were instructed to compete to see who was best. Students were informed that they would (a) individually complete daily worksheets and take a final test, (b) be graded on how their performance was first, second, third, or fourth in their group, and (c) receive bonus points if they were the first student in the class to complete the voyage. Three subgoals (for example, who can reach land first, who is the first to collect gold) were given and bonus points awarded during the unit. A class chart was used to show which students were winning. Students were told to play fair by observing the time limits on the computer, try to be first in completing the computer search and the daily worksheets, compare their performance with that of the other three members of the group, and do their own work without interacting with the other students. The teacher's role was to structure each day's work and monitor the competitive groups to ensure that appropriate behavior was taking place.

In the computer assisted individualistic learning condition students were assigned randomly to computers in groups of four (there was one group of five) stratifying for sex and ability. Students were informed that they would (a) individually complete daily worksheets and take a final exam, (b) be graded on the basis of how their performance compared with a preset criteria of excellence, and (c) receive bonus points on the amount of gold they accumulated individually. Three subgoals were presented during the unit. The subgoals included who could reach land within a certain time period and who could obtain some gold within a certain time period. Students received daily feedback in a folder available only to the individual student and the teacher. Students were told to observe the time limits on the computer, work hard to achieve up to the preset criteria of excellence, keep track of their progress, and do their own work without interacting with classmates. The teacher's role was to structure each day's work and monitor the students to ensure that appropriate behavior was taking place.

Dependent Variables

The achievement measures consisted of daily worksheets, the final examination, and the success of the students in accumulating gold. The daily, 10-item worksheets tested students' comprehension of and ability to apply the reading material assigned that day. The final examination consisted of 19 multiple-choice items of which 8 measured factual recognition, 8 measured application, and 3 measured problem solving. The test was constructed by the teachers and research staff involved in the study. Finally, the amount of gold accumulated by the student was used an an index of problem-solving success.

The oral interaction measure consisted of observing students' task, management, and social interactions. Task interactions were defined as those involving repetition of information, presenting new information, elaborating on information being learned, asking task-related questions, replying, giving support for others' learning, and indicating understanding of what is being learned. Management interactions were defined as those informing group members on procedures being used to accomplish the group's work, asking questions about group procedures, and replying. Social interactions were defined as informing group members about topics unrelated to the group's work and procedures, asking questions about such topics, and replying. This instrument has been validated in previous studies and has a reliability of over 0.90. The frequency of task, management, and social cross-handicap interaction was determined for each condition.

Students' perceptions of each other were measured by a sociometric nomination instrument in which students were asked to list the names of the males and females in their class who (1) were most able to get other people to do things, (2) were best at games or sports, (3) have the most trouble with reading, and (4) were best at computers.

The attitude scales included a 6-item Liking for Computers scale (alpha = .86), a 4-item Liking for Geography scale (alpha = .81), a 3-item Confidence With Using Computers scale (alpha = .71), a 4-item Computers Are A Male Domain scale (alpha = .76), a 7-item Achievement Motivation Goal Orientation scale (alpha = .87), a 9-item Achievement Motivation Persistence scale (alpha=.87), a 4-item Teacher Academic Support scale (alpha = .79), a 4-item Teacher Personal Support scale (alpha = .75), a 4-item Cooperation scale (alpha=.82), a 4-item Individualistic scale (alpha = .87), and an 8-item Competition scale (alpha = .81).

Analyses

A multivariate ANOVA was conducted to test for main effects and interaction among conditions. On the basis of a significant multivariate analysis, a 3x2 ANOVA was used to analyze differences between the three conditions and males and females. In the competitive condition, *t*-tests were conducted to determine the degree of difference between males and females. Finally, Pearson correlations were conducted between the measure of achievement motivation and the other dependent variables.

Experimental Check

Each classroom was observed daily to verify that the conditions were being taught appropriately. The results of these observations verified that the conditions were being implemented appropriately.

Results

The first dependent variable was achievement. From Table 1 it may be seen that students in the cooperative condition completed more worksheet items, $F(2,57) = 8.11$, $p<.01$, and had more worksheet items correct, $F(2,57) = 13.24$, $p<.01$, than did the students in the competitive or individualistic conditions. In the competitive condition, males completed more worksheet items than did females, $t(19) = 3.44$, $p<.10$. The final exam contained three types of questions, those requiring factual recognition of material learned, those requiring the application of the material being learned, and those requiring problem-solving. From Table 1 it may be seen that students in the cooperative condition performed higher than did the students in the other two conditions on the factual recognition, $F(2,57) = 3.00$, $p<.05$, application, $F(2,57) = 4.48$, $p<.01$, and problem-solving, $F(2,57) = 2.46$, $p<.10$. Males performed higher than did females on factual recognition, $F(2,57) = 6.47$, $p<.01$, and problem-solving, $F(2,57) = 6.66$, $p<.01$. The students in the cooperative condition accumulated significantly more gold than did the students in the competitive and individualistic conditions, $F(2,57) = 31.20$, $p<.01$.

The interpersonal interaction data indicate that in the cooperative condition there were more task statements, $F(2,61) = 28.99$, $p<.01$, more management statements, $F(2,61) = 7.24$, $p<.01$, fewer social statements, $F(2,61) = 3.38$, $p<.05$, and fewer talks to the teacher, $F(2,61) = 4.99$, $p<.01$. In the cooperative condition less than 1 percent of students' statements were addressed to the teacher, in the competitive condition 19 percent of the statements were addressed to teacher, and in the individualistic condition 12 percent of students' statements were addressed to the teacher. There were no significant differences in the oral activeness of male and female students.

The sociometric data indicate that students in the competitive and individualistic conditions perceived more peers as being poor readers than did students in the cooperative condition, $F(2,61) = 3.46$, $p<.05$. Males, compared with females, were perceived in all conditions to be more influential, $F(1,61) = 8.05$, $p<.01$, and best at using computers, $F(1,61) = 18.74$, $p<.01$.

Students in the cooperative condition indicated higher goal orientation than did the students in the other two conditions, $F(2,57) = 4.21$, $p<.05$. The female students in the cooperative and individualistic conditions expressed higher persistence in trying to achieve than did the males, while just the opposite was true in the competitive condition, $F(2,57) = 5.71$, $p<.01$. The students in the cooperative condition were more cooperatively oriented, $F(2,57) = 8.85$, $p<.01$, and were less individualistically oriented, $F(2,64) = 2.37$, $p<.10$, than were the students in the other two conditions. Students in the individualistic condition were somewhat less competitive than were students in the other two conditions, $F(2,57) = 2.46$, $p<.10$.

In the competitive condition males accumulated more gold than did females, $t(20) = 2.21$, $p<.05$. Females were somewhat more individualistic than males, $F(1,57) = 3.65$, $p<.10$. Females had more negative attitudes toward competition than did males, $F(1,57) = 23.94$, $p<.01$.

In the competitive condition females had less confidence than males in their ability to work with computers, $t(19) = 2.15$, $p<.05$, they liked geography less, $t(19) = 2.10$, $p<.05$, they liked computers less, $t(19) = 2.43$, $p<.05$, they had less positive achievement motivation, $t(19) = 2.13$, $p<.05$, they perceived less personal support from the teacher, $t(19) = 2.43$, $p<.05$, they perceive less academic support from the teacher, $t(19) = 2.30$, $p<.05$, and they were less competitive than were the males, $t(19) = 2.61$, $p<.05$.

Discussion

The purpose of this study was to compare the relative efficacy of computer-assisted cooperative, competitive, and individualistic learning in promoting high achievement, oral interaction among students, perceptions of status, and positive attitudes toward the subject area and the instructional methods. The achievement results of this study parallel the findings of the previous research on cooperative, competitive, and individualistic learning situations. This supports Clark's (1983) conclusion that computers are a vehicle that do not in themselves change the consequences of instruction. In this study a number of diverse indices of achievement were used:

1. Quantity of daily production.
2. Quality of daily production.
3. Success in problem-solving.
4. Accuracy of recognition of factual information studied.
5. Ability to apply facts in test questions requiring higher-level reasoning.
6. Ability to apply facts in problem-solving test questions.

The results of this study clearly indicate that when computer-assisted cooperative, competitive, and individualistic learning are compared, computer-assisted cooperative learning promotes higher quantitity and quality of daily achievement, greater mastery of factual information, greater ability to apply one's factual knowledge in test questions requiring application of facts, and greater ability to use the factual information to answer problem-solving questions. Students in the cooperative condition were far more successful in problem solving than were students in the competitive and individualistic conditions. Cooperation also promoted greater motivation to persist in striving to accomplish learning goals than did competitive and individualistic efforts. Given the complex problem solving required by the task, the conceptual material on mapping and navigation to be learned, and the additional problem of learning how to operate the computer program successfully, students cooperating with one another outperformed their counterparts who were competing with one another or working individualistically. These results corroborate the previous research comparing the impact of the three goal structures on students' achievement on tasks that did not require the use of the computer (Johnson, Johnson, & Maruyama, 1983). The discussion, coordination, and joint actions taken by the students in the cooperative condition promoted greater conceptual understanding of the material by all students and greater retention of what they learned. The finding that students in the cooperative condition daily worked faster and more accurately than did the students in the competitive and individualistic conditions should provide some reassurence to educators who worry that the group discussion will slow down the progress of students' learning.

The second issue examined in this study was the oral statements made by students while working with computers. All students were placed in groups of four, which were structured cooperatively, competitively, or individualistically. Students in the cooperative condition made far fewer statements to the teacher and more statements to each other. The student-student interaction within the cooperative condition was almost entirely learning oriented, consisting of statements concerning the completion of the assigned work and the ways in which the group could best work to maximize their success. In the competitive and individualistic conditions, the student-student interaction was primarily social, involving talking about issues unrelated to the assigned work and the procedures for best accomplishing their learning goals. In the cooperative and individualistic conditions there were no significant differences in the oral interaction patterns of male and female students, in the competitive condition the male students engaged in more off-task socializing than did the females.

When students were placed at a computer in a group of four (or five) the way in which their learning goals were structured greatly influenced who students interacted with and what they tended to say. Within the competitive and individualistic learning situations, relatively few comments took place. In addition to the task statements that were made to other students, conversation either was directed at the teacher or was off-task social comments directed at peers. Within the cooperative learning situation, students engaged in relatively frequent exchange of task-related information with almost no interaction with the teacher. Such oral interchange has been related to use of higher level reasoning strategies, conceptual understanding, and long-term retention of information being learned (Johnson & Johnson, 1983). A number of researchers have concluded that the cognitive processes most necessary for deeper level understanding and the implanting of information into memory, such as elaboration and metacognition, occur only through dialogue and interaction with other people (Baker, 1979; Markman, 1979; Schallet & Kleinman, 1979). Cooperative learning promoted more of such interaction than did competitive and individualistic learning.

The third issue examined in this study was the attitudes toward computer-assisted instruction and the subject area being studied. There were no differences among conditions on these attitudes.

The fourth issue examined was the difference between male and female students in the three types of computer-assisted instruction situations. There were a number of interesting differences between the male and female students in the study. Males, compared with females, performed higher on the recognition and problem-solving questions on the final examination, were less individualistic and more competitive, perceived more academic support from teachers, and perceived the computer to be more of a male domain. In the cooperative condition females liked working with computers more than did males, while the opposite was true in the competitive condition. If educators wish to promote females' success in using computers and positive attitudes toward working with computers, computer-assisted cooperative learning situations should be emphasized.

Competition among students over who was most successful in the computer-assisted instruction seemed to have an especially debilitating effect on the female students. Within the competitive condition, females performed less well on the problem-solving task (i.e., accumulated less gold) than did males, were less motivated to achieve (were less goal oriented and persistent), felt less confident in their ability to work with computers, liked computers less, liked geography less, and felt less supported personally and academically by the teacher. The lower success females had using the computer within the competitive condition and the negative attitudes toward computers they developed is of some concern. Social scientists warn that those who avoid computers will shut themselves out of a wide range of careers and opportunities. Computers are reputed to becoming indispensable in business, government, the sciences, and communication. If females go through school feeling they can not cope with technology, they will limit their career choices and will eliminate themselves from many higher level positions. It may be that the mixture of technology, science, and competition is especially detrimental to female achievement and attitudes.

When the comparative status of male and female students was examined, males were nominated more frequently than were females as being most able to influence other group members, best at sports, as having trouble reading, and being best at using computers. Within the computer-assisted instructional situation, both males and females perceived males to be of higher status.

This is one of the first studies to compare the effectiveness of cooperative, competitive, and individualistic goal structures in computer-assisted instruction. The results indicate that when teachers wish to maximize achievement in computer-assisted learning tasks they will be well-advised to structure the lesson cooperatively rather than competitively and individualistically. Females will especially be adversely affected by competitively structured computer-assisted lessons. The combination of cooperative learning and computer-assisted instruction seems like a productive one for classroom learning.

Table 1

Means For Dependent Measures

	Cooperative		Competitive		Individualistic		
	Male	Female	Male	Female	Male	Female	F-Value
Questions Completed	45.82	43.56	33.00	26.10	36.93	30.55	CCI: 8.11***
Questions Correct	20.73	17.56	7.46	8.00	12.71	10.73	CCI:13.24***
Test: Recognition	11.44	8.86	9.10	7.11	8.64	6.55	CCI: 3.00** MF: 6.47***
Test: Application	8.78	7.86	6.40	5.44	5.50	5.73	CCI: 4.48**
Test: Problem Solve	10.67	6.71	8.80	7.11	6.86	6.46	CCI: 2.46* MF: 6.66***
Gold Accumulated	71.64	84.11	30.64	6.30	13.14	6.91	CCI:31.20***
Achievement Mot.	3.35	3.56	3.41	2.86	3.07	3.29	Int: 4.58***
Cooperative	3.43	3.67	2.75	2.65	2.66	2.82	CCI: 8.85**
Individualistic	2.82	3.19	3.32	3.58	3.23	3.68	CCI: 2.37* MF: 3.65*
Competitive	3.77	2.65	3.53	2.73	3.10	2.46	CCI: 2.46* MF:23.94**
Liked Geography	3.21	3.47	3.48	2.78	3.15	3.32	
Teacher Academic Support	4.27	4.03	4.07	3.28	3.98	3.86	MF:4.11**
Teacher Personal Support	3.71	3.58	3.64	2.80	3.34	3.39	
Liked Computers	3.68	4.06	4.20	3.13	3.89	3.96	MF: 2.96* Int: 6.32***
Computer Confidence	3.82	4.00	4.15	3.20	3.74	3.70	
Computers Male Domain	2.14	1.69	2.09	1.81	2.27	1.32	MF: 5.79**
Task Statements	46.58	36.58	12.91	8.09	8.86	8.55	CCI: 28.99**
Management Statements	3.33	4.17	1.36	1.09	1.14	1.09	CCI: 7.24**

Social Statements	2.17	.83	8.36	3.09	3.57	3.73	CCI: 3.38**
Statements To Teacher	.03	.01	.11	.07	.12	.13	CCI: 4.98**
Nominations: Most Able	6.58	3.73	3.90	2.83	5.23	2.92	MF: 8.05**
Nominations: Best At Sports	6.75	1.82	4.00	1.83	6.62	1.42	MF: 18.59**
Nominations: Most Trouble Reading	1.42	1.18	3.40	2.42	2.54	1.25	CCI: 3.46** MF: 2.84*
Nominations: Best At Computers	4.25	1.55	6.10	.92	4.15	3.08	MF: 18.74**

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